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little turned up at the end; it is cloven-footed, like the ox, but it has a kind of spear-like appendage behind, which assists it in moving over precipices and rugged ways; the wool on the back is short, but long on the sides and the belly. Like the camel, it has the faculty of abstaining long from water, (sometimes four or five days); and, like that animal's, their food is coarse and trifling. They are neither allowed corn nor hay; green herbage, of which they eat very moderately, being sufficient for their nourishment.

CATECHISM OF BOTANY.*

This is a plain, simple, well-written little book, much on the plan we have taken occasion from time to time to recommend to those writing or compiling works professedly for the instruction or information of the younger classes of the community. It is not a mere dry catalogue or detail of scientific names and observations. It gives in a very limited compass a general view of the structure of plants, and the peculiarities of vegetable life. Indeed we quite agree with the author, that "the mere knowledge of the names of plants, and the orders to which they belong, without investigating farther, is learning but as it were the first alphabet of botany; and unless it be studied in connexion with the other departments of nature, and in relation to the structure, and economy, and uses of plants, it can be accounted as little else than a mere pastime. The vegetable kingdom, however, thus investigated, will be found to possess as deep and pleasing an interest as any other department of the wonderful works of nature."

By a reference to the 153d number of our Journal, the reader will find a brief outline of the principal elements of botany. The following, which we have picked out here and there from the little work before us, will serve to explain or elucidate some of the terms and observations there brought forward:—

"Q. How is the stem of woody plants formed?

"A. The stem consists of an outer skin or cuticle; of a soft, pulpy, or herbaceous matter; of the liber or bark; of alburnum and wood; and of the central pith or medulla.

"Q. What is the cuticle?

"A. The outer skin or cuticle is found in all plants, and serves to protect the soft parts beneath from injury. It is generally thin, tough, and transparent. It gives support to the hollow stems of reeds and grasses, and in the bamboo it is found to contain a considerable portion of flint. The same substance gives firmness to the stalks of oats and wheat.

"Q. What is found next to this outward skin?

"A. Immediately below the skin is a green, soft, pulpy, and juicy substance, called the herbaceous or cellular integument. It forms the cork of the cork-tree.

"Q. Where is the bark situated?

"A. The *liber*, *cortex*, or bark, is situated under this soft pulpy matter. It consists of a fibrous network, minutely plaited together; and, having been formerly used as a substitute for paper, hence was derived the name of *liber*, a book. This bark contains the oils, resins, gums, &c. found in various trees.

"Q. What is the *cambium*?

"A. The *cambium* is a juice which comes from the inner part of the bark, and which serves to repair wounds and loss of substance in plants. By forming the alburnum, it gradually increases the bulk of stems.

"Q. Where is the *alburnum* situated?

"A. The *alburnum*, or false wood, is the outer layers of softish substance seen when the bark is peeled off. It is at first soft and juicy, but gradually hardens into wood.

"Q. How are those circular rings formed which are seen when a piece of wood is cut across?

"A. Those rings are the successive layers of the *alburnum*, one of which is consolidated into wood every year. Thus the age of a tree may be known by counting the number of circles in the wood.

"Q. What is the colour of wood?

"A. It is of various colours, as white, red, black, &c. according to the kind of tree.

"Q. What is the pith or marrow?

"A. The pith is the soft spongy substance which forms the centre of the stem. It is more juicy in young shoots and plants than in old, and is seen of large size in the elder-tree.

"Q. How do the stems of plants increase in height?

"A. The palm tribe, reeds, and similar plants, grow from the top, tube after tube shooting downward in succession, as in the bamboo, in oats and in other grains. The oak and similar trees grow by circular layers added to the breadth of the stem beneath the bark, and forming cone within cone in yearly succession.

"Q. Do plants grow quickly?

"A. In warm climates palms and canes have been ascertained to grow twelve inches in twenty-four hours, and shoots of corn in our warm summers spring up with amazing rapidity. The *agave Americana* has been seen on the shores of the Mediterranean to shoot out, when in flower, a stalk of thirty-one feet high, in thirty or forty days, thus growing nearly one foot in a day. Other trees, again, as the oak and elm, are of very slow growth, but in the course of ages gradually acquire a prodigious bulk.

"Q. What is the greatest height to which trees will grow?

"A. Palms in America have been found growing to the height of 150 feet, and a species of pine (*Pinus Lambertiana*) to 250 feet. The greatest height of trees in Europe is from 120 to 130 feet; and the oak, elm, and cedar have attained to 25 and 30 feet in circumference.

"Q. Of what use are the leaves of plants?

"A. The leaves of plants may be compared to the lungs of animals. They absorb or take up the air of the atmosphere, which enters into combination with their juices, and thus contributes to the life and growth of the plant. They also absorb or give out moisture according as the plant requires it.

"Q. What is the structure of leaves?

"A. Leaves are formed of a framework of fibres, intimately netted together, between which is a soft pulpy substance, like the herbaceous membrane of the stem; the whole is covered and protected by a thin porous skin. In the centre of the leaf runs the mid rib or middle nerve, by which the leaf is connected with the stalk. Sometimes there is a leaf stalk called *petiole*; at other times it is wanting, when the leaf is said to be *sessile*.

"Q. How are leaves named with respect to their tip?

"A. They may be *obtuse*, or blunt; *acute*, or pointed; *acuminate*, with a long taper point; *abrupt*, when the end seems as if cut off; *notched*, ending with a small notch; *retuse*, terminated by a broad shallow one.

"Q. What are the principal terms applied to the margins?

"A. With respect to their margins, leaves are termed *entire* when destitute of teeth or notches on the edges; *toothed*, having small protuberances; *serrated*, when the teeth are sharp, close, and directed towards the end of the leaf; *crenate*, or notched, when the teeth are broad, and not directed towards either end; *fringed*, bordered with hairs; *thorny*, with thorns or spines on the margin.**

"Q. What part of the air do plants absorb?

"A. The leaves of plants decompose carbonic acid gas,—give out its oxygen, and retain the carbon. During night, when the sun is absent, plants are supposed to give out carbonic acid; in sunshine they give out oxygen or vital air.

"Q. Does light seem necessary to vegetables?

"Yes; the leaves of plants are always turned to the light. Some leaves fold themselves up during the night, and again expand at sunrise. * *

"Q. What are the other parts of plants?

"A. The other most remarkable parts of plants are the flowers or blossoms, containing the organs by which seeds are produced for the propagation of the species.

"Q. Is there any similarity in this respect between plants and animals?

"A. There is this remarkable similarity, that many plants are, like animals, male and female. In some plants, as the common palm, all the blossoms of one tree are male flowers, and all those of another female. In other plants, as the chestnut, distinct male and female blossoms grow on the same tree. In the greater proportion of plants, however, the male and female organs are contained within the same flower or blossom."

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* A Catechism of Botany; or, Natural History of the Vegetable Kingdom. By William Rhind. Edinburgh; Oliver and Boyd.

Here follows the scientific division of flowers into calyx, corolla, stamen, pollen, pistil, &c. &c. a correct description of which wlll be found in the number of our Journal to which we have referred.

CLASSIFICATION OF VEGETABLES.

" Q. How is the vegetable kingdom arranged and classified ?

" A. There are two methods of arrangement that claim the chief attention of botanists—the artificial and the natural. Of the former, the system proposed by Linnæus is the best; of the latter, Jussieu invented a system which has been extensively adopted.

" Q. What is the method of Linnæus ?

" A. Linnæus arranges the vegetable kingdom from the sexual organs of the flower, dividing plants according to the number and position of the stamens and pistils.

" Q. What method does Jussieu follow ?

" A. Jussieu classifies plants according to their natural resemblances in general form, the relative position of the stamina, and the number of seed-lobes, and divides the whole into fifteen classes.

" Q. What are the merits of each of these methods ?

" A. The artificial arrangement of Linnæus is reckoned the easiest for the botanist to discriminate the species of plants, while the natural method of Jussieu is best calculated to convey a knowledge of the respective structure and properties of the various groups and families into which the vegetable kingdom is in general divided."

The classification is then given.

" Q. In what manner are the various orders of these different classes farther divided ?

" A. Orders are still farther subdivided into genera and species.

" Q. How is the genus or family distinguished ?

" A. The characteristic marks of the genera or families of plants are pointed out from the peculiarities of the flower and fruit; so that certain plants belonging, from their general characters already described, to a particular class or order, if they be found to have a still farther resemblance in their fruits or seeds, and in certain shapes and forms of the flowers, are arranged under one common genus or family.

" Q. What is the meaning of species ?

" A. A species consists of all the individual plants that resemble each other in all their parts; and each species is distinguished by some peculiarities of form which is not met with in the whole genera, and still less in the order and class to which it belongs. Accordingly, in the description of species, no characters ought to be enumerated which are common to the higher divisions to which it belongs; but some peculiarities in the flower, fruit, leaves, or stems, are to be fixed on to point it out.

" Q. Are any other divisions made use of by botanists ?

" A. Beyond the species composed of individual plants, there is no other subdivision, excepting that of varieties depending upon accidental circumstances, such as a difference in the colour of the flowers; but in those genera and orders where the species are numerous, they have been marked out into sections, comprehending plants allied to each other by some marks of resemblance.

" Q. What method, then, is to be pursued in order to ascertain the names of plants, and the proper place to which they belong in their botanical arrangement ?

" A. The principles of the Linnæan classification being distinctly understood, in order to apply them to practice we select flowers, if possible, in different states of progress; but, above all, it is essential that one or more blossoms be expanded. We first examine the number of stamens and pistils, and their positions, and by this means we ascertain to what class and order the particular plant belongs; next, from the shape of the corolla, position of the seed, &c., we ascertain the genus or family of the plant; and lastly, by the peculiarity of the leaves, stem, root, or minute parts of the flower, we determine the species. For this purpose, a systematic work on botany, where the leading characters of plants are minutely pointed out, is necessary.

" Q. What are the leading divisions into which the vegetable kingdom may be formed according to the natural method ?

" A. There are three divisions—*Acotyledonous*, or *Cryptogamic*, where the flowers are wanting or imperfectly developed, and the seeds germinate from any point of their surface, whereas in the other classes they always germinate from a definite point; as fungi, lichens, mosses, and ferns. II. *Monocotyledonous*, where the seed consists of only one lobe or cotyledon, together with the germ; as the grasses and grains, palms, &c. III. *Dicotyledonous*. where there are two seed lobes; as the oak, ash, &c.

THE SUGAR-CANE.

" Q. What is the sugar-cane ?

" A. The sugar-cane is a kind of reed, from the juice of which the common sugar is made.

" Q. Of what country is it a native ?

" A. The sugar-cane is supposed to have come originally from China; for sugar was known in that country two thousand years before it was introduced into Europe. From China the plant found its way into India and Arabia; but it was not till early in the fifteenth century that it appeared in Europe.

" Q. Where was it chiefly cultivated ?

" A. It was first raised in the island of Sicily; from thence it passed into Spain, Madeira, and the Canary Islands; and after the discovery of the New World, it was introduced into the West India Islands, where it is now cultivated to a great extent.

" Q. What is the general appearance of the sugar-cane ?

" A. It is a tall slender plant, growing from ten to twenty feet in height, with numerous joints or knots, a leaf growing from each, and bushy with leaves at the top.

" Q. What is the mode of rearing it ?

" A. It is always raised from slips or cuttings, which are planted at the proper season, in prepared ground, in rows three or four feet apart, with an interval between each plant of two feet.—During the season, the plants are carefully hoed; and when they come to maturity, they are cut down and carried in bunches to the mill.

" Q. How is sugar made from them ?

" A. The canes are bruised by machinery till all their juice is pressed out. This juice is collected and boiled in vessels, with a certain quantity of lime to take up any acidity. When sufficiently boiled, it is poured out into shallow trays to cool, when the sugar crystallizes. The remaining liquor is called molasses.

" Q. What is made of this juice ?

" A. The whole refuse of the sugar-mill is collected, and after fermentation is distilled into rum."

THE TOBACCO PLANT, &c.

" Q. What sort of plant produces tobacco ?

" A. The common tobacco is the dried leaf of an herbaceous plant, a native of America, where it is extensively cultivated in fields. The plant, when eaten in any quantity, or an infusion of it, is highly poisonous.

" Q. When was it first used in this country ?

" A. Tobacco was first introduced into Europe by Sir Walter Raleigh in the reign of Queen Elizabeth. Since that period its use has gradually extended, in some shape or other, over most parts of the civilized world. The poisonous property which it possesses is called *narcotic;* and in common with several other substances, as opium, tea, and coffee, it acts upon the nervous system, causing an exhilaration of the spirits.

" Q. Are there other poisonous plants belonging to this family ?

" A. Yes: *Hyoscyamus*, or henbane; *Belladonna*,[*] or deadly nightshade, and *Stramonium*, or thorn-apple, are plants the leaves of which are used in medicine.

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[*] Through the kindness of a correspondent, we will, in an early number, be enabled to present our readers with a more interesting description of this and some other plants, relative to the properties of which it may be well to be informed, than we have yet seen in print.

" Q. From whence is the potato, or *Solanum tuberosum*, supposed to have come originally ?

" A. It is supposed that the potato is a native of the New World, and was first brought to Britain by Sir Walter Raleigh.* For a long period this useful root was only reared in gardens as a rare vegetable, and was not brought into general use till about the beginning of the 18th century. In the year 1728, a cottar of the name of Thomas Prentice in Stirlingshire reared potatoes in his small garden, and was the means of making them generally known throughout the country.

" Q. Is the potato cultivated in other countries ?

" A. Fortunately this useful plant can bear the extremes, and thrives in the soil of almost every climate of the globe. Its cultivation throughout Europe and America is now very general; and in some places, as in Ireland, it forms almost the whole support of the natives."

THE TEA-PLANT.

" Q. What belongs to the next family, or *Ternstrœmiaceæ* ?

" A. This family is remarkable for containing the tea-plant.

" Q. Describe the appearance of the tea-plant.

" A. The *thea*, or tea plant, is a low shrub, with a small lance-formed leaf, and a blossom somewhat resembling that of the wild rose, but smaller. It is a native of China and Japan, and is there made an object of culture. It is propagated by seeds, and so uncertain is their vegetation, that seven or eight of these are sown in each hole to ensure one plant. The shrubs are planted in rows, and the ground between carefully weeded. The first crop of leaves is not collected till the third year after sowing.

" Q. How are these leaves prepared ?

" A. They are picked off the shrubs and placed in shallow baskets, and exposed to the air or sunshine for some hours; they are then placed in a flat cast iron pan, over a stove heated with charcoal, and stirred about quickly till they dry. After this they are put into baskets, and rubbed between the fingers, until they are rolled up into the form in which tea is brought to market.

" Q. How are the different kinds of tea obtained ?

" A. The tea so extensively consumed in Europe is produced by different species of *thea* and *camellia*. According to some botanists, however, there is but one species of tea-plant, and all the varieties of tea depend upon the quality of the leaves, and the situation where they have grown. These are picked from the plant four times in the year. The first, or green tender leaves, form the green tea; the second and third ordinary teas; and the last picking, when the leaves are dry and old, is the least valued.

" Q. When was the use of tea first adopted ?

" A. The Chinese have used an infusion of this herb from time immemorial; but it was first introduced into Europe by the Dutch in 1666, in small quantity. Since that period its use has become so general in Britain, that no less than 29,495,199 pounds are annually consumed."

In this way nearly every tree, shrub, plant, and root, at all known in these countries, is treated of and explained; and the entire is closed by the following simple directions for preparing an herbarium :—

" Q. How are plants preserved so as to form an herbarium ?

" A. All plants to be so preserved must be taken when in blossom. The best specimens are to be selected, and, when practicable, a piece of the root, the stem with its leaves and the flower blossom fully expanded, so as the whole characters of the specimen may be properly seen. If the plant be too large for this, a portion showing the flowers and a few of the leaves will be sufficient. Having thus collected the specimens required, they are to be placed in a tin-box and carried home.

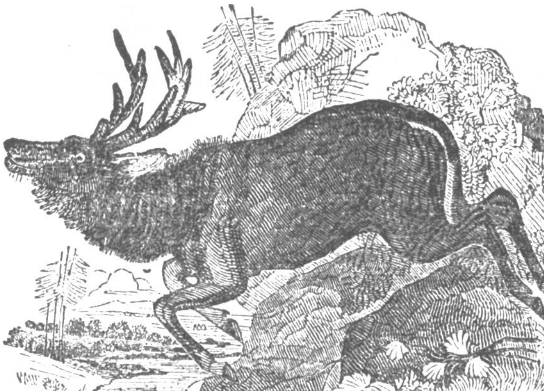
" Q. How do we proceed with them afterwards ?

" A. The different specimens, after their characters and names have been ascertained and noted down, together with the locality where they were found, are to be laid on sheets of common smooth paper, carefully placing the blossoms and leaves in their exact positions. Several sheets of paper are to be laid between every two specimens; boards of the same size are to be placed above and below; and a weight, sufficient to keep the leaves and stems flat, is to be placed above all. The weight at first should not be too great, as it is apt to bruise the stem and leaves, and to press out the juice. As they dry gradually, they may be examined after the lapse of a few days; the paper may be changed if damp, and any irregularities of position rectified. They should be deposited in an airy shaded place, removed from the sunshine.

" Q. How are the specimens to be next treated ?

" A. When sufficiently dry, they are to be affixed to sheets of paper by means of a little mucilage or glue; or narrow slips of paper, pasted over the principal stems, will keep them firm in a proper position. They are afterwards to be washed over with a weak solution of corrosive sublimate in spirits of wine, about five grains to the ounce, with the addition of five grains of camphor, which will brighten their colours, and preserve them from the attacks of insects. After the names are affixed below the plants, with the places where each was found, and any other interesting information regarding them, the whole are to be arranged according to orders and genera, and, if kept in a moderately dry apartment, the collection may be preserved for many years."

On the whole, we can recommend the Catechism of Botany, as being one of the best and cheapest of its kind that we have seen.



THE RUSA DEER

Is an inhabitant of the jungles and forests of continental India, and the islands of the Eastern Archipelago. There are several varieties of the species. The great rusa is remarkable for the ample mane with which its neck is clothed. It varies from three to three and a half feet in height, and is covered with a thick coat of dry, frizzled hair, which is generally of a dirty brown, inclining to black.

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* " Among the anecdotes told of this enterprising voyager, it is said, that when his gardener at Youghal in the county of Cork had reared to the full maturity of 'apples' the potatoes which he had received from the knight as a fine fruit from America, the man brought to his master one of the apples, and asked if *that* were the fine fruit. Sir Walter, having examined it, was, or feigned to be, so dissatisfied, that he ordered the weed to be rooted out. The gardener obeyed, and in rooting out the weeds found a bushel of potatoes."

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